UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
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OFFICE OF
ENVIRONMENTAL
REVIEW AND
ASSESSMENT

April 23, 2018

Jennie Fischer, NEPA Team Leader
Nez Perce-Clearwater National Forests
104 Airport Road
Grangeville, Idaho 83530

Dear Ms. Fischer:

The U.S. Environmental Protection Agency has reviewed the Draft Environmental Impact Statement for the proposed Hungry Ridge Restoration Project on the Salmon River Ranger District of the Nez Perce-Clearwater National Forests (EPA Project Number 14-0008-AFS/CEQ Number 20180034). Our review was conducted pursuant to the National Environmental Policy Act, the Council on Environmental Quality regulations at 40 CFR 1500-1508 and Section 309 of the Clean Air Act. Section 309 directs the EPA to review and comment in writing on the environmental impacts associated with all major federal actions.

The DEIS analyzed the Forest Service's proposal to manage the Nez Perce-Clearwater Forests vegetation to restore natural disturbance patterns; improve long-term resilience at the stand and landscape level; reduce the potential risk to private property and structures; improve watershed conditions; and maintain/improve habitat in the Mill Creek and Johns Creek watersheds within the Salmon River Ranger District of the forests. The DEIS considered three Action Alternatives and a No Action alternative. The proposed alternative, Alternative 2, would commercially harvest 8,750 acres using intermediate harvest and regeneration harvest prescriptions. Alternative 2 would also conduct harvest and prescribed fire activities within 180 acres of Management Area 20 (MA 20 or old growth) and treat with prescribed fire across 12,372 acres of the planning area. In addition, the project would include the addition of temporary and specified roads, as well as road reconditioning, maintenance, and reconstruction. Watershed improvement activities would include road storage and decommissioning, culvert replacements, stream crossing improvements and riparian hardwood planting over 87 acres. Alternative 3 would include less new and temporary road and exclude mechanical treatment in MA 20. Alternative 4 would include no new or temporary road construction, no mechanical treatment in MA 20, and no landscape prescribed burning. It would also include meadow restoration as an additional watershed restoration activity.

At scoping, the EPA was satisfied the Forest Service would design the DEIS alternatives based on an understanding of natural disturbance and stand development processes (i.e. ecological forestry). We promoted this course of action in our 2014 scoping comments and encouraged the Forests to consider a suite of resources that have been developed in recent years to facilitate the application of ecological forestry. Based on our review of the DEIS, we are unsure of the extent to which the action alternatives adhere to ecological forestry principles. Our comments in 2014 also encouraged the Forests to consider the climate change impacts both on and from the project, consistent with Forest Service guidance.[1] Our

[1] http://www.fs.fed.us/emc/nepa/climate_change/includes/cc_nepa_guidance.pdf

review finds a robust discussion of potential changes to carbon storage within the DEIS, however questions remain regarding the impact that a changing climate may have on the project.

In 2014, the EPA also recommended the development of an alternative that would minimize road construction. We appreciate the development of Alternatives 3 and 4 to address this issue. Our review finds Alternative 4 to be environmentally preferable with regard to road construction, silvicultural prescriptions, and watershed enhancement activities. Alternative 4 does not, however, include prescribed fire, which is critical to moving the landscape toward desired conditions. We also note that due to the potential implementation costs, Alternative 4 may not be economically viable. As the Forests develop the FEIS, we encourage the consideration of a blended alternative which incorporates elements of Alternatives 3 and 4.

Based on our review, we are rating the DEIS as Environmental Concerns – Insufficient information (EC-2). An explanation of the EPA rating system is enclosed.

The EPA continues to support the stated Forest Service goals of restoring landscape resilience, improving watershed and fisheries resources, improving early seral habitat and providing a source of wood products for local industry. We appreciate the opportunity to review and comment on the DEIS. If you have any questions about our review, please contact Teresa Kubo of my staff at (503) 326-2859 or by electronic mail at kubo.teresa@epa.gov, or you may contact me at (206) 553-1841 or by electronic mail at nogi.jill@epa.gov.

Sincerely,

/S/

Jill A. Nogi, Manager
Environmental Review and Sediment Management Unit

Enclosures:

1. EPA Region 10 Detailed Comments on the Hungry Ridge Restoration Project Draft Environmental Impact Statement
2. U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements

EPA Region 10 Comments on the Hungry Ridge Restoration Project
Draft Environmental Impact Statement
April 23, 2018

Ecological Forestry

The EPA supports the use of ecological forestry, which in general terms refers to silvicultural practices based on an understanding of natural disturbance and stand development processes. We recognize the proposed openings in the action alternatives, ranging up to 787.1 acres in size, are intended to emulate what would occur under a large catastrophic fire. However, we do not find the proposed patch sizes or the proposed retention levels at 6-10 trees per acre for clearcut stands reflected in the literature.

Widely distributed large, old trees provide a critical backbone to dry pine and dry to mesic mixed-conifer forest landscapes.[2] Where large old trees occur within the proposed harvest units, the EPA recommends they be retained in order to provide structure to the forest landscape and an anchor point for establishing species and spatial heterogeneity. Although there will be variation in terms of retention across the landscape, a broad body of science supports the notion that pre-settlement density of trees in mixed-conifer patches was frequently 50 to 100 trees per hectare (20 to 40 trees per acre).[3] This level of retention would be more closely aligned with the proposed shelterwood harvests in the action alternatives. To establish individual openings (where there is little or no tree retention), some practitioners of ecological forestry advocate the "Individuals, Clumps and Openings" or ICO approach, developed by Derek Churchill and others (cited below). In general, this approach recommends a mix of openings ranging from less than half an acre to an acre. We appreciate that some of the units may be dominated by single cohort lodgepole pine, and lacking large old or legacy trees. It is reasonable to expect a fire in those stands would be largely stand replacing. We continue to encourage the Forests to carefully consider where the ICO approach can and should be applied. An implementation guide was developed in 2016 and is included among the references provided.

Ecological forestry also recognizes the value of early seral habitat. Recently disturbed patches tend to support high plant productivity, and often exhibit a particularly high diversity of plant and animal species. Early successional habitats are also important for ungulate summer forage, and several species of migratory songbirds. The full expression of early seral habitat may be cut short by planting coniferous species shortly after harvest, as is proposed in the DEIS. While we recognize the existing seed bank may necessitate planting in order to ensure the re-establishment of desired early seral, fire tolerant tree species, we recommend that consideration be given to where planting can be avoided or delayed in order to promote the development of complex early seral habitat.

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[2] Ellison AM, Bank MS, Clinton BD, Colburn EA, Elliot K, Ford CR, Foster DR, Kloeppel BD, Knoepp JD, Lovett GM, Mohan J, Orwig DA, Rodenhouse NL, Sobczak WV, Stinson KA, Stone JK, Swan CM, Thompson J, Von Holle B, Webster JR (2005) Loss of foundation species: consequences for the structure and dynamics of Forested ecosystems. Front Ecol Environ 3:479–486

[3] Stine, Peter; Hessburg, Paul; Spies, Thomas; Kramer, Marc; Fettig, Christopher J.; Hansen, Andrew; Lehmkuhl, John; O'Hara, Kevin; Polivka, Karl; Singleton, Peter; Charnley, Susan; Merschel, Andrew; White, Rachel. 2014. The ecology and management of moist mixed-conifer Forests in eastern Oregon and Washington: a synthesis of the relevant biophysical science and implications for future land management. Gen. Tech. Rep. PNW-GTR-897. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 254 p.

Recommendations*:*

- We recommend the Forests consider the available tools and approaches for incorporating spatial reference patterns into silvicultural prescriptions, including, as mentioned above, the application of the ICO approach across the harvest units. Relevant references include:
    - Churchill, D.J., A.J. Larson, S.M.A. Jeronimo, P.W. Fischer M.C. Dalhgreen, and J.F. Franklin. 2016. The ICO approach to quantifying and restoring forest spatial pattern: Implementation guide. Version 3.3 Stewardship Forestry and Science, Vashon, Washington, USA. Available at: https://www.fs.usda.gov/nfs/11558/www/nepa/103397_FSPLT3_3986281.pdf
    - Churchill, D.J., A.J. Larson, S.M.A., M.C. Dalhgreen, and J.F. Franklin. 2013. The ICO approach to quantifying and restoring forest spatial pattern: Implementation guide. Version 2.0. Stewardship Forestry, Vashon, Washington, USA
    - Churchill, D.J., A.J. Larson, M.C. Dalhgreen, J.F. Franklin, Hessburg, P.F., and James A. Lutz. Restoring forest resilience: From reference spatial patterns to silvicultural prescriptions and monitoring. Forest Ecology and Management 291 (2013) 442-457

- We also note there is a need to introduce spatial heterogeneity at multiple scales, from ecoregion to tree neighborhood scales. This will necessitate thinking about climatic and topographic drivers as well as interactions among native ecological patterns and processes. The following reference provides seven core principles to consider when seeking to restore fire-prone Inland Pacific landscapes. We recommend the Forests consider these principles and incorporate them into the harvest prescriptions developed for the FEIS:
    - Hessburg, Paul F.; Churchill, Derek J.; Larson, Andrew J.; Haugo, Ryan D.; Miller, Carol; Spies, Thomas A.; North, Malcolm P.; Povak, Nicholas A.; Belote, R. Travis; Singleton, Peter H.; Gaines, William L.; Keane, Robert E.; Aplet, Gregory H.; Stephens, Scott L.; Morgan, Penelope; Bisson, Peter A.; Rieman, Bruce E.; Salter, R. Brion; Reeves, Gordon H. 2015. Restoring fire-prone Inland Pacific landscapes: seven core principles. Landscape Ecology. 30(10): 1805-1835

- We further recommend the FEIS clarify the Forests intent with regard to replanting. The DEIS indicates that planting will be a project component but does not include information about proposed stocking levels or units proposed for planting. We recommend the Forests consider where planting might be limited or delayed in order to promote early seral habitat. The following references provide insight on this and other facets of ecological forestry:
    - Franklin, J.F., K.N. Johnson, D.J. Churchill, K. Hagmann, D. Johnson, and J. Johnston. 2013. Restoration of dry forests in Eastern Oregon: a field guide. The Nature Conservancy, Portland, OR. 202 p.
    - Stine, Peter; Hessburg, Paul; Spies, Thomas; Kramer, Marc; Fettig, Christopher J.; Hansen, Andrew; Lehmkuhl, John; O'Hara, Kevin; Polivka, Karl; Singleton, Peter; Charnley, Susan; Merschel, Andrew; White, Rachel. 2014. The ecology and management of moist mixed-conifer forests in eastern Oregon and Washington: a synthesis of the relevant biophysical science and implications for future land management. Gen. Tech. Rep. PNW-GTR-897. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 254 p.
    - USDA General Technical Report NRS-19 "Natural Disturbance and Stand Development Principles for Ecological Forestry" http://www.fs.fed.us/nrs/pubs/gtr/gtr_nrs19.pdf

- Larson, A.J., Churchill, D. 2012. Tree spatial patterns in fire-frequent forests of western North America, including mechanisms of pattern formation and implications for designing fuel reduction and restoration treatments. Forest Ecology and Management, 267 (2012) pp 74-92

Climatic Considerations

Chapter 3 of the DEIS provides a robust discussion of potential changes to carbon storage as a result of project implementation. Our review finds the DEIS does not provide the same depth of analysis regarding how changes in the climate may affect the environmental outcomes of the project. Therefore, we encourage a more robust discussion in the FEIS of the known and predicted vulnerabilities under these changes and how those resources at risk within the project area may be affected over time.

According to the 2014 Climate Change Vulnerability Assessment for Resources of the Nez Perce-Clearwater National Forests (cited below), the following changes are projected for the Nez Perce-Clearwater National Forests:

- By 2040, average annual temperature is expected to increase by 2.5℃, with warmer seasonal temperatures generally occurring in the summers;
- Minimum and maximum temperatures are also projected to increase, with more significant increases in summer and winter;
- By 2040, precipitation is generally expected to decrease in summer (-13 to -20%) and increase in spring (+5 to +10%), winter (+5%), and fall (+2%);
- Combined flows of runoff and baseflow are projected to increase in winter (+19%) and decrease in summer (-23%);
- Daily mean stream flow volumes are projected to decrease ~5-10%;
- Annual snowpack is projected to decline ~21%;
- Historically snow-dominated basins are projected to become transitional (i.e., those basins with between 10-40% of winter precipitation entrained in April 1 snowpack) and transitional basins are projected to become rain dominated by the 2040s, having the potential to cause large changes in the timing and magnitude of seasonal hydrographs;
- The day each year when 50% of the year's streamflow has passed is projected to occur as much as 4-6 weeks earlier in 2040, compared to the historic baseline;
- July 1 soil moisture is projected to decline by up to 35% across the Columbia River Basin;
- In the Nez Perce-Clearwater region, soil moisture is modeled to decrease slightly in summer, with increases in spring and fall;
- In the summer, stream temperatures may warm at rates of 0.3-0.45℃ per decade, causing a net increase of 1.2-1.8℃ by mid-century. Further, stream isotherms may shift 5-143 kilometers upstream if air temperatures rise by 2℃;
- Lower-order streams in upland areas are projected to have less warming than larger arteries in lower elevations; and,
- Warming winters with lower snowpack and increased proportion of rain to snow could lead to increases in area burned, and warming spring and winter conditions could continue to lengthen the fire season.

We recommend the project alternatives and prescriptions be considered within this context. We further recommend that particular attention be given to the implications that unit size may have on winter snowpack accumulation, ablation, and subsequent soil water availability, peak flows, and base flows. A

2017 study of canopy cover effects on snowpack depth by J. T. Stevens (cited in the recommendations section below) found that the spatial scale of canopy gaps may determine whether there is deeper, longer-lasting snowpack or shallower, shorter-lasting snowpack compared to f orested sites. The study states that

> "Increasing fire severity [canopy gap size] had a strong negative effect on snowpack depth, suggesting that increased ablation after fire [large scale harvest], rather than increased accumulation, was the dominant control over snowpack duration. Contrary to expectations, the unburned Forests condition had the highest overall snowpack depth, and mean snow depth among all site visits was reduced by 78% from unburned Forests to high-severity fire. However, at the individual tree scale, snowpack depth was greater under canopy openings than underneath canopy, controlling for effects of fire severity and aspect. This apparent paradox in snowpack response to fire at the stand vs. individual tree scales is likely due to greater variation in canopy cover within unburned and very low severity areas, which creates smaller areas for snow accumulation while reducing ablation via shading. Management efforts to maximize snowpack duration in montane Forests should focus on retaining fine-scale heterogeneity in Forests structure."

Recommendation:
We recommend the Forests consider the potential interaction between unit size, retention requirements, and winter snowpack accumulation, ablation, and subsequent soil water availability, peak flows, and base flows. This analysis should be placed in the context of current as well as future climate (considering expected stand condition at year 2040). Relevant references for consideration include:

- EcoAdapt. 2014. A Climate Change Vulnerability Assessment for Resources of the Nez Perce Clearwater National Forests. Version 1.0. EcoAdapt, Bainbridge Island, WA.
- Stevens, Jens T. 2017. Scale-dependent effects of post-fire canopy cover on snowpack depth in montane coniferous forests. Ecological Applications, 27(6), pp. 1888-1900
- Gabrielle Boisramé, Sally Thompson, Scott Stephens. 2018. Hydrologic responses to restored wildfire regimes revealed by soil moisture-vegetation relationships. Advances in Water Resources, 112 (2018) 124-146
- Gabrielle Boisramé, Sally Thompson, Brandon Collins, Scott Stephens. 2016. Managed Wildfire Effects on Forest Resilience and Water in the Sierra Nevada. Ecosystems (2017) 20: 717

Roads/Sediment
As noted in the Chapter 3 of the DEIS, each of the watersheds within the project area are already experiencing some road-related impacts, with most of the watersheds being rated as "moderate" with regard to watershed health and road densities. It is also noted on pages 3-17 through 3-20 that the creeks in the project area are fairly high gradient and efficient at passing sediment downstream. Given these underlying factors, we are concerned that the modeling under NEZSED predicts that each of the action alternatives would cause sedimentation to approach or exceed Forest Service guidelines for sediment production (percent over base sediment yield) in the near term. We appreciate this is likely an overestimation of sediment production due to the model's assumption that all activities would be completed in year one. We also understand through communication with the analysis team that routing calculations within the NEZSED model may need to be revisited in the FEIS. Each of the sub-watersheds within the project area drains into the South Fork Clearwater River, currently listed as water quality impaired for temperature and sediment under section 303(d) of the Clean Water Act. Our review does not find a clear basis for the determination, on page 3-26, that potential downstream effects (e.g.

sediment and temperature) are not expected to result in measurable changes in the South Fork Clearwater River or any river reaches downstream. Given the sensitive downstream resources and the existing issues with roads, sediment and watershed health, we strongly encourage the Forests to pursue opportunities to reduce the number of new and temporary roads. We recommend the Forests consider development of a blended alternative that would seek to minimize new and temporary road construction consistent with Alternative 3 and, where economically feasible, maximize the use of harvest methods which limit the need for road construction consistent with Alternative 4.

Given the number of road miles proposed under Alternatives 2 and 3, we also encourage the Forests to consider road-related sediment impacts more directly. Tools such as the Geomorphic Roads Assessment Inventory Package (GRAIP) and its GIS-based counterpart GRAIP_Lite can provide a helpful screen of potential road-related sediment. We recommend the FEIS include an analysis of road-related sediment using GRAIP_Lite. GRAIP_Lite is a GIS tool for predicting sediment production on forest roads, delivery of sediment to streams, and accumulation of road sediment within the stream network. GRAIP_Lite is flexible, so it can be run with default values and calibrations or it can be customized with local erosion and delivery calibrations and observed drainage locations. The model can be used as a prioritization tool to determine areas of high road sediment impact and it can be used to compare road treatment alternatives. In-person training on the GRAIP_Lite tool will be available May 8-9, 2018 in Boise, Idaho and May 10-11, 2018 in Pendleton, Oregon. Registration details will be shared under separate cover.

U.S. Environmental Protection Agency Rating System for
Draft Environmental Impact Statements
Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections

The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns

EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections

EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory

EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.